Face recognition in the presence of angry expressions: A target-race effect rather than a cross-race effect

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HIGHLIGHTS

- We tested the effect of angry expressions on memory of White and Black faces.
- We used a new stimuli set, to account for possible stimulus issues in past work.
- We found that angry expressions impaired memory for Black faces, compared to neutral.
- We tested both a White and a Black participant sample, finding similar results.
- We propose a stereotype-congruency explanation for the findings.

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ABSTRACT

Perceivers usually recognize the faces of members of their own racial group more accurately than the faces of other races — a difference which is called the cross-race effect (CRE). When showing this effect, research has typically used facial stimuli with neutral emotional expressions. A few studies have examined the effect with faces showing angry expressions (Ackerman et al., 2006; Krumhuber & Manstead, 2011; Young & Hugenberg, 2012), and these have generally shown enhanced recognition of outgroup angry faces, an effect that Ackerman et al. (2006) attributed to greater attention paid to threatening outgroup members. However, these studies suffer from stimulus confounds, in that the Black angry faces were particularly unusual, as revealed in our pretest data. Additionally, only White participants were used in these studies, raising the question of whether the reported effects are truly ingroup–outgroup effects. Reported here are two studies, using first White and then Black participants, that used a novel stimulus set that avoided earlier confounds. Participants studied and later attempted to recognize White and Black faces, varying in their emotional expression (angry versus neutral) both at encoding and testing. Both experiments showed a pro-ingroup CRE. However, contrary to prior research, both participant races had relatively more difficulty recognizing angry Black faces, such that when the faces were angry, the pro-ingroup CRE was strengthened for White participants and weakened for Black participants. We discuss theoretical explanations for these results which substantially qualify past conclusions about the role of facial emotions in cross-race facial recognition.

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Introduction

Social psychologists have had a long-standing interest in what is commonly called the cross-race effect (CRE), the tendency for participants to remember the faces of ingroup members more effectively than the faces of outgroup members (for reviews, see Hugenberg, Young, Bernstein, & Sacco, 2010; Meissner & Brigham, 2001; Young, Hugenberg, Bernstein, & Sacco, 2012). In a typical demonstration of this effect, White participants are shown to remember White faces better than Black (e.g. Malpass & Kravitz, 1969) or Asian faces (e.g. Ferguson, Rhodes, Lee, & Sriram, 2001). Theoretically, this effect is of interest because of what it reveals about face processing and about the role of social categorization in face processing. On a more applied level, the effect has major consequences for eye-witness identification in interracial contexts.

Had researchers only tested the CRE with White participants, one would be concerned about whether the effect is truly a cross-race effect, due to ingroup versus outgroup targets, or the effect is just specific to particular participant and target groups. However, subsequent research has found that the CRE is generalizable even to non-racial ingroup–outgroup contexts, as well as across both perceiver race and target race. Social psychologists have found the "cross-race effect" between

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minimal groups (Bernstein, Young, & Hugenberg, 2007; Van Bavel, Packer, & Cunningham, 2011), students from different universities (Hugenberg & Corneille, 2009), and the sexes (Slone, Brigham, & Meissner, 2000). CRE researchers have also used Asian (Goldinger, He, & Papesh, 2009; Rhodes et al., 2009), Hispanic (Evans, Marcon, & Meissner, 2009; Marcon, Susa, & Meissner, 2009), Egyptian (Megreya, White, & Burton, 2011), and Black (Chiroro, Tredoux, Radaelli, & Meissner, 2008; Malpass & Kravitz, 1969; Pauker et al., 2009) participant samples, and have generally found that non-White participants have poorer memory for White faces than for faces of their own race. According to a meta-analysis, however (Meissner & Brigham, 2001), White participants tend to show a stronger CRE than non-White participants. In sum, the effect clearly seems to be an ingroup–outgroup one, although there can be group-specific moderators of its strength.

Multiple explanations have been proposed for the CRE. These can be generally divided between perceptual learning models on one hand, and social cognitive models on the other. As suggested by Hugenberg et al. (2010), there is good support for both. The perceptual learning models start with the assumption that people are more familiar with their own race than others, and therefore they have more expertise in processing own-race than other-race faces (Meissner & Brigham, 2001). Accordingly, people should come to have smaller CREs and better memory for outgroup faces as they gain more experience with the outgroup. Indeed, Meissner and Brigham (2001) found in a meta-analysis that the CRE tends to be reduced among participants who have higher levels of prior interracial contact.

In contrast, according to the social-cognitive models, people have the skill but not the will to remember outgroup faces. That is, people find the ingroup to be particularly relevant to the self, and so by contrast, people attend to them more closely and process them more thoroughly than outgroup members (Correll & Park, 2005; Rodin, 1987; Van Bavel, Swencionis, O'Connor, & Cunningham, 2012). Additionally, Levin (1996, 2000) argues that people are more likely to spontaneously categorize outgroup members than ingroup members (Fiske, Lin, & Neuberg, 1999). As a consequence, they individuate outgroup members less and hence have lower recognition memory for them.

According to Hugenberg et al. (2010), the social-cognitive models imply that categorization and attention should moderate the CRE. For example, researchers have found a larger CRE when White participants encode White faces before Black faces in separate blocks, as opposed to a single mixed block, presumably because White faces are categorized less often when contrasting Black faces are not yet present (Young, Hugenberg, Bernstein, & Sacco, 2009). Researchers have also shown improved recognition rates for outgroup faces by instructing participants to differentiate outgroup members from each other (Hugenberg, Miller, & Claypool, 2007). They have also found smaller CREs in situations where the outgroup has more power and social status, making them more attention-worthy (Ratcliff, Hugenberg, Shriver, & Bernstein, 2011; Shriver & Hugenberg, 2010; Shriver, Young, Hugenberg, Bernstein, & Lanter, 2008).

Conflicting research on angry expressions as a moderator of the CRE

In the present research, we investigate another potential moderator that may affect attention and categorization processes: angry facial expressions of the target faces. We are interested in this CRE moderator, because there are alternative theoretical possibilities for how and why it may moderate the CRE, and because there are conflicting findings in the literature on the subject (Ackerman et al., 2006; Corneille, Hugenberg, & Potter, 2007).

First, angry faces and other threatening stimuli are known to capture and hold attention (Fox et al., 2000; Öhman, Flykt, & Esteves, 2001; Öhman, Lundqvist, & Esteves, 2001). Because of this extra attention, faces that are threatening may be more memorable. Additionally, as argued by Ackerman et al. (2006), angry outgroup faces may be even

more threatening and attention-grabbing than angry ingroup faces. Accordingly, angry expressions might attenuate the CRE by increasing attention to outgroup faces. This argument was advanced and seemingly supported in research reported by Ackerman et al. (2006) and Young and Hugenberg (2012).

On the other hand, in the context of Black and White target groups, perceivers could be affected by stereotypic expectations about these two target groups, which could play a role in how angry facial expressions moderate the CRE. There is now considerable evidence that Blacks in the United States are stereotyped as threatening and potentially dangerous (Correll, Park, Judd, & Wittenbrink, 2002; Devine, 1989; Hugenberg & Bodenhausen, 2003). If perceivers have worse recognition memory for faces that they categorize, rather than individuate, then it seems possible that perceivers may categorize faces more when the faces have facial expressions that are stereotypically consistent for their racial category, leading to worse recognition memory. This would suggest worse recognition for angry Black faces than for non-angry Black faces. White participants would then show a larger CRE with angry faces, due to impaired memory for angry outgroup (i.e., Black) faces. On the other hand, if the social stereotype really is shared even among Blacks (Correll et al., 2002), then Black participants might also increase categorization processes when faced with angry Black faces, thus perhaps reducing the CRE for them. This stereotype-congruency view predicts that memory for angry Black faces might be impaired by angry expressions for all participants.

In support of their argument that angry expressions decrease the CRE generally, Ackerman et al. (2006) had White participants view several angry White, angry Black, neutral-expression White, and neutral-expression Black faces. On a later memory test, participants were less accurate at remembering Black neutral faces than White neutral faces, consistent with the CRE, but they were actually better at remembering Black angry faces than White angry faces. Similar results were found by both Krumhuber and Manstead (2011) and Young and Hugenberg (2012), for whom White participants showed a reversed (Krumhuber & Manstead, 2011) or non-significant (Young & Hugenberg, 2012) CRE with angry White and Black faces, even as they showed a significant CRE with neutral faces.

Although these results have been replicated, there are some reasons to question them. First, all of the research cited above exclusively used White participants. Accordingly, it is unclear whether these results are due to the outgroup being better remembered when its members manifest anger or due to a general tendency for the angry Black targets to be better remembered. In other words, these results are entirely consistent with anger enhancing memory for Black faces rather than enhancing memory for outgroup faces more generally.

A second and related concern is that these prior results may be due to the particular samples of stimulus faces used. Ackerman et al. (2006) used very small stimulus samples (for instance, only four encoded Black angry faces with four Black angry lures). Furthermore, to us, the Black angry faces appeared to have many idiosyncrasies and were particularly striking. Thus, we suspect that these angry Black faces were particularly memorable and would be so for any group of participants. We test this suspicion in ways we describe below. In replicating the Ackerman et al. (2006) results, Young and Hugenberg (2012) used nearly an identical photo set, and Krumhuber and Manstead (2011) used many of the same photo sources. Thus, it is possible that these successful replications are simply due to the specific stimuli used throughout all of these studies. Additionally and importantly, in Ackerman et al. (2006) and Young and Hugenberg (2012), targets with angry expressions were not the same individuals as targets with neutral expressions. In other words, the specific features of individual targets (e.g., perhaps a strange hairstyle) were not held constant across emotional expressions.

One additional study has explored the effect of angry expressions on the magnitude of the CRE, using a totally different face stimulus set. Corneille et al. (2007) used a large set of computer-generated Black